of a looſe texture alſo,and,according as the cold ſtrikes inwards from the bottom and ſides, are quenched, as it were, and made rigid in that very poſture wherein the cold finds them. For the parts of the *cruſt* being already hardened, will not ſuffer the parts to ſhrink any more from the outward Surface inward; and though it ſhrink a little by reaſon of the ſmall parcels of ſome Aerial ſubſtances diſperſed through the matter of the Glaſs, yet that is not neer ſo much as it appears (as I juſt now hinted;) nor if it were,would it be ſufficient for to conſolidate and condenſe the body of Glaſs into a *tuff* and cloſe *texture*, after it had been ſo exceſſively rarified by the heat of the glaſs-Furnace.

But that there may be ſuch an expanſion of the aerial ſubſtance contained in thoſe little *blebbs* or bubbles in the body of the drop, this following Experiment will make more evident.

Take a ſmall Glaſs-Cane about a foot long, ſeal up one end of it *hermetically*,then put in a very ſmall bubble of Glaſs, almoſt of the ſhape of an Eſſence-viol with the open mouth towards the ſealed end, then draw out the other end of the Pipe very ſmall,and fill the whole Cylinder with water, then ſet this Tube by the Fire till the Water begin to boyl, and the Air in the bubble be in good part rarified and driven out, then by ſucking at the ſmalling Pipe, more of the Air or vapours in the bubble may be ſuck'd out, ſo that it may ſink to the bottom; when it is ſunk to the bottom,in the flame of a Candle,or Lamp,nip up the ſlender Pipe and let it cool: whereupon it is obvious to obſerve, firſt, that the Water by degrees will ſubſide and ſhrink into much leſs room: Next, that the Air or vapours in the Glaſs will expand themſelves ſo, as to buoy up the little Glaſs: Thirdly, that all about the inſide of the Glaſs-pipe there will appear an infinite number of ſmall bubbles,which as the Water grows colder and colder will ſwell bigger and bigger, and many of them buoy themſelves up and break at the top.

From this *Diſceeding* of the heat in Glaſs drops,that is, by the quenching or cooling Irradiations propagated from the Surface upwards and inwards, by the lines CT, CT, DT, DE, *&c.* the bubbles in the drop have room to expand themſelves a little, and the parts of the Glaſs contract themſelves; but this operation being too quick for the ſluggiſh parts of the Glaſs, the contraction is performed very unequally and irregularly, and thereby the Particles of the Glaſs are bent, ſome one way, and ſome another, yet ſo as that moſt of them draw towards the Pith or middle TEEE, or rather from that outward: ſo that they cannot *extricate* or unbend themſelves, till ſome part of TEEE be broken and looſened, for all the parts about that are placed in the manner of an Arch, and ſo till their hold at TEEE be looſened they cannot fly aſunder, but uphold, and ſhelter, and fix each other much like the ſtones in a Vault, where each ſtone does concurre to the ſtability of the whole Fabrick, and no one ſtone can be taken away but the whole Arch falls.And whereſoever any of thoſe radiating wedges DTD, *&c.* are removed, which are the component parts of this Arch,the whole Fabrick preſently falls to pieces;



pieces; for all the Springs of the ſeveral parts are ſet at liberty, which immediately extricate themſelves and fly aſunder every way; each part by its ſpring contributing to the darting of it ſelf and ſome other contiguous part. But if this drop be heat ſo hot as that the parts by degrees can unbend themſelves, and be ſettled and annealed in that poſture, and be then ſuffered gently to ſubſide and cool; The parts by this nealing loſing their ſpringineſs, conſtitute a drop of a more ſoft but leſs brittle texture,and the parts being not at all under a flexure, though any part of the middle or Pith TEEE be broken,yet will not the drop at all fly to pieces as before.

This Conjecture of mine I ſhall indeavour to make out by explaining each particular Aſſertion with *analogous* Experiments: The Aſſertions are theſe.

Firſt, That the parts of the Glaſs, whilſt in a fluid Conſiſtence and hot, are more rarified, or take up more room, then when hard and cold.

Secondly, That the parts of the drop do ſuffer a twofold contraction.

Thirdly, That the dropping or quenching the glowing metal in the Water makes it of a hard, ſpringing, and rarified texture.

Fourthly, That there is a flexion or force remaining upon the parts of the Glaſs thus quenched, from which they indeavour to extricate themſelves.

Fifthly, That the Fabrick of the drop, that is able to hinder the parts from extricating themſelves, is *analogus* to that of an Arch.

Sixthly, That the ſudden flying aſunder of the parts proceeds from their ſpringineſs.

Seventhly, That a gradual heating and cooling does anneal or reduce the parts of Glaſs to a texture that is more looſe, and eaſilier to be broken, but not ſo brittle.

That the firſt of theſe is true may be gathered from this, That *Heat is a property of a body ariſing from the motion or agitation of its parts*; and therefore whatever body is thereby toucht muſt neceſſarily receive ſome part of that motion,whereby its parts will be ſhaken and agitated, and ſo by degrees free and extricate themſelves from one another, and each part ſo moved does by that motion *exert* a *conatus* of *protruding* and diſplacing all the adjacent Particles. Thus Air included in a veſſel, by being heated will burſt it to pieces. Thus have I broke a Bladder held over the fire in my hand, with ſuch a violence and noiſe, that it almoſt made me deaf for the preſent,and much ſurpaſſed the noiſe of a Muſket: The like have I done by throwing into the fire ſmall glaſs Bubbles hermetically ſealed, with a little drop of Water included in them. Thus Water alſo,or any other Liquor,included in a convenient veſſel,by being warmed, manifeſtly expands it ſelf with a very great violence, ſo as to break the ſtrongeſt veſſel, if when heated it be narrowly impriſoned in it.

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